FY 2006 Report to the Legislature
Enhanced 911 (E911) Program

Washington Military Department
Emergency Management Division

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Overview

With the passage of SHB 2543 during the 2006 Legislative Session, the sunset date for the Enhanced 911 Advisory Committee was extended for five years to 2011. Additionally, a position was allocated to the E911 Advisory Committee for a representative from a Voice over Internet Protocol (VoIP) industry. The E911 Advisory Committee is also required to annually provide an update on the status of E911 service in the state to the appropriate legislative committees.

Integration of Voice over Internet Protocol (VoIP) into the Existing Enhanced 911 Systems

Voice over Internet Protocol (VoIP) uses commonly available packet technology to supply voice services. This technology is not new, but is now used with the availability of high-speed internet connections. Packet technology is common in modern telephone networks and for practical purposes has replaced switched circuits for all switch-to-switch transmission in North America. In technical terms, VoIP is a consumer version of a technology already present in telecommunications systems.

The implementation of VoIP services is accomplished through two business models. Broadband service providers such as cable companies, and in some cases telephone companies, can easily utilize VoIP as the primary service technology for the provisioning of voice telephone service. This permits providers to use existing cable path to act as a Competitive Local Exchange Carrier (CLEC). The second business model is to offer equipment that permits the customer to utilize the customer's existing broadband connection for voice telephone services. For 911 purposes, each of these models creates different circumstances.

VoIP, used as a service technology by traditional carriers or CLEC to 911, looks like wireline service. This VoIP methodology uses local connections to the public-switched telephone network where companies integrate to Enhanced 911 using practiced techniques. This integration is often transparent to the E911 authority, including the maintenance of customer location information. These companies pay all telephone fees and taxes, including county and state E911 excise taxes.

VoIP sold as an adjunct service to existing broadband connections presents an interesting set of problems for E911 service. It is sold as a commodity product where the customer can connect on demand, including switching to different internet service providers at will. This means the customer controls the product selection that ultimately determines quality for essential 911 functions. This purchase flexibility also means the service supplier may not be located within Washington State for purposes of routing calls to the E911 system. One

important aspect of E911 includes indicating the caller's location which for this type of VoIP service must be entered by the customer. These VoIP providers are not, in most circumstances, remitting the state or local E911 excise taxes due to questions concerning the applicability of the excise tax to their service.

The Federal Communications Commission recognized the issue with non-local carriers and E911 routing. The FCC rules require integration to E911 utilizing a three-step process. The second phase of this process, called "i2" was completed in November 2005. It utilizes techniques developed for wireless systems to deliver the call to the correct 911 answering point with dynamic loading of the caller's location. Washington State collaborated with carriers to implement processes and procedures that permit carriers to comply with the FCC order. The i2 VoIP interface was implemented statewide in November and December of 2005. There is continuing implementation as VoIP service expanding to previously underserved areas within the state requiring new connections to E911.

The i3 solution provides full integration with the 911 networks that can be implemented after 911 networks migrate to an internet protocol-based call management system. The development of this Next Generation 911 (NG 911) system is moving forward with implementation planning and major involvement by the State of Washington in the development process. NG 911 moves from 1968 technology currently deployed for most E911 call management to IP-based services. This migration to newer technology permits full integration of VoIP systems and many other E911 service enhancements.

Appointment of VoIP Representation to the E911 Advisory Committee
At the completion of the 2006 Legislative session the E911 Advisory Committee extensively pursued recruiting VoIP industry participation for representation. The TCS Company will represent wireless and VoIP interests on the committee. VoIP only company nominees declined to participate. The E911 Program Office continues to seek additional VoIP representatives. VoIP providers have requested to be included on the E911 Advisory Committee distribution list for materials and the ability to comment on initiatives.

Program Overview
In 1991 the Washington State Legislature enacted Engrossed Substitute House Bill (ESHB) 1938. This bill served to establish a statewide emergency communications network of Enhanced 911 (E911) telephone service, which allows an immediate display of a caller's identification and location, to enhance the safety, health, and welfare of the state's citizens.

ESHB 1938 was passed by the Legislature and signed by the Governor, placing the issue of funding enhanced 911 statewide on the fall 1991 ballot. Referendum 42 is codified as RCW 82.14B. Referendum 42 was overwhelmingly approved by the voters. The legislation authorized the collection of a 20 cent per access line per month excise tax by the State to assist counties in implementing 911 systems

and a similar county collection of 50 cents per access line. By December 31, 1998, each county, singly or in combination with adjacent counties, was required by law to implement district-wide, county-wide or multi-county-wide E911 emergency communications systems. This initial requirement provided E911 throughout the state. By law, each county provides funding for the Enhanced 911 in an amount equal to the maximum local tax that 50 cents would generate, or the amount necessary to provide jurisdiction system full funding, whichever is less.

The E911 program is supported by a tax on all telephone access lines in the state. There are two E911 taxes to include both a state tax ($.20/month) and county tax ($.50) on wireline and wireless telecommunications that are collected/remitted by each telecommunications company.

The State Enhanced 911 (E911) Program assists and coordinates the counties' operations and continued advancement of E911 systems which provide expedient, reliable public access to emergency services statewide.

E911 Advisory Committee Overview

E911 Advisory Committee Vision --**To provide the most responsive 911 access to emergency services in the world**.

The Program's Strategic Plan has identified 10 goals that are vital to the functionality of E911 in Washington State.

1. Sustain an E911 network that is efficient, economic, and flexible in addressing the current and future demands of E911.
2. Encourage legislation supporting current/future program needs.
3. Support of program in establishing policies and procedures which are consistently applied, statewide.
4. Promote 911 as a recognized emergency services discipline.
5. Create strategy for addressing telecommunications technologies that access 911.
6. Maintain a well-educated base group of 911 professionals on all aspects of the E911 Program.
7. Develop best practices for the provision of E911 service.
8. Educate the public on the appropriate use of 911.
9. Establish and maintain relationships with other emergency services agencies, providers and industries to benefit the E911 program.
10. Develop and promote a plan to explain current and future revenue sources.

The E911 Advisory Committee assigns the goals to work groups. These strategic goals focus the State Emergency Management Division's Enhanced 911

Program Office activities. In 2006, the work groups for the E911 Advisory Committee focused efforts towards Pandemic Preparedness Planning, Wireless/VoIP, Public Education, Telecommunicator Training, 2-1-1, Strategic Planning, and Policy Review. The work groups are formed on an as-needed basis, and may be on-going or of limited duration.

FY 2006 Projects

E911 Advisory Committee Work Groups

Policy Review Subcommittee -- Includes a representative of the E911 Advisory Committee, the counties, and State E911 staff. This group reviews policies and provides clear direction to assure sustainability and equality of support to counties. This subcommittee and the other work groups provide user-based involvement with its focus at providing Washington State residents effective and efficient E911 service.

The Policy Review Committee reviewed and approved the following policies:

- FY07 Operations Contract
- Year-End Supplemental Funding
- E911 Coordinator Forum Attendance
- E911 Advisory Committee Meeting Attendance
- E911 Telephone System Support
- Logging/Voice Recorder Support
- E911 Call Detail Recorder Support
- E911 Auxiliary Generator Support
- E911 Uninterruptible Power Supply Support
- E911 Wireless Phase II Definition
- Training
- Public Safety Answering Point (PSAP) Mapping
- Computer-Aided Dispatch (CAD)

- **Strategic Planning Subcommittee** -- Reviewed and revised the statewide Enhanced 911 Strategic Plan through FY2009.

- **Pandemic Preparedness Planning Subcommittee** -- Developed guidelines for continuity of business of Public Safety Answering Points (PSAP) in the event of a Pandemic Flu Epidemic. Their work is being circulated nationally as a model.

Wireless Work Group – This long-standing subcommittee has established itself as a unique meeting place for the public-safety community and wireless carriers to discuss concerns and develop resolutions to issues of wireless and VoIP as needed, for communications interfaces to E911 systems. This work group produced standards that provide safety results through uniform operational protocols for use in Washington State. Work group products are in demand as a "best practice" nationally.

Hardware/Software/Technical Support

The Qwest **Frame Relay Upgrade Project** replaced outdated equipment (1200 BAUD or BPS, bits per second) and single path data circuits with state-of-the-art technology to allow faster delivery of 911 caller automatic location identification. Antiquated equipment was replaced with a T1 (1.544 megabits per second) with two PVCs (permanent virtual circuits) providing a committed information rate (CIR) of 16 kilobits per second. Equipment upgrade permits the transmission of longitude and latitude information for cell phone calls without delays due to congestion. The $1.6M equipment upgrade was completed in June 30, 2005 and accommodates data transfer capabilities for the Next Generation 911 (NG911) services. NG911 will be phased in over the next few years. This equipment upgrade affects all Washington counties with Qwest services except King County completed previously.

Qwest completed the installation of the **Dual Tandem Project** to the 911 system to provide system redundancy and diversity. This $1.8M major enhancement affects every county in Washington with Qwest service provides a dual tandem network with mirrored trunking and software to include comparable upgrade to the Verizon system. Prior to the Dual Tandem implementation, only a single selective router was available to the Public Safety Answering Point (PSAP) for processing receipt of a 911 call. If the Selective Router (SR) failed, the 911 call would not be received at the PSAP. This project allowed for an additional SR at each PSAP. The second SR is positioned remotely at a different switching office. Approximately one-half of the 911 calls from any one location go through the remote router serving that area to assure uninterrupted service. The probability of a 911 call not reaching the PSAP has been greatly reduced. This enhancement affects all Qwest and Verizon phone subscribers. The large scale of this state-wide project prompted a three-month implementation to move subscribers to their new routing pattern. Counties will not see any E911 cost increase in response to this project, and all upgrades were completed without service interruption.

- **Telecommunications Service Priority (TSP) project assures priority restoration from disruptions to the 911 network trunking.**

  TSP is a service which sets by priority the 911 system order for restoration of services should a trunk become disabled due to a man-made or natural disaster. The State E911 Program will assume responsibility for costs associated with providing this service that previously were paid by each county. The network components that serve each location are installed in separate facilities to mitigate the possibility 911 call disruptions.

- Provided a leadership role on the **National Reliability and Interconnectivity Council (NRIC) VII of the Federal Communication Commission (FCC).** This working committee reviewed 911 outages nationwide to determine

prevention best practices lessons learned.. In reviewing existing best practices, the NRIC group identified solutions focused at both telecommunications and public safety.

- Active participation on **the Institute of Electrical and Electronic Engineers (IEEE) Committee** to develop best practices for Public Safety Answering Points (PSAPs) which align with NRIC Best Practices.

- Provided a leadership role on the Washington State Interoperability Executive Committee (SIEC) as chair of the **SIEC Advisory Funding Enterprise (SAFE).** SAFE developed funding recommendations for statewide interoperability radio systems.

- Supported active national participation of the **Association of Public-Safety Communications Officials' (APCO)** Telecommunicator Emergency Response Taskforce (TERT).

- Provided a national leadership role to the **National Emergency Number Association's (NENA)** Automatic Collision Notification/Vehicle Telematics committee, creating technical information documents that delineate the industry implementation process.

- Provided leadership and direct involvement with national standards bodies under the **Alliance for Telecommunications Industry Solutions (ATIS)** committee of the **Emergency Services Interconnection Forum (ESIF).** ESIF is the primary venue for the telecommunications industry, public safety and other stakeholders to generate and refine both technical and operational interconnection issues to ensure that life-saving E911 services are available for everyone in all situations. ESIF enables many different telecommunications' entities to fully cooperate and interconnect with each other to determine the best practices and solutions necessary to effectively and promptly deploy E911 services nationwide. ESIF is one of the leaders in establishing Next Generation 911 (NG 911) documentation and standards for emergency services network and systems.

- Actively supported and participated in other organizations including the **National Association of State Nine-one-one Administrators (NASNA)** to facilitate information sharing between states and local government. NASNA's focus is to find common, affordable solutions for 911 issues as well as to gain support for the needs of the industry.

Public Education and Training

Developed collaborative partnerships with state, federal, and private vendors including:

- The Office of the School of Public Instruction for risk managers in public schools on private branch exchange (PBX) phone systems and 911 call delivery provisions contained in state law.

- The Emergency Management Division of the Washington Military Department public education with the September National Preparedness Month campaign and the April Emergency Preparedness Month campaign that distribute informational publications to targeted audiences.

- Collaborations with boating and maritime industries, businesses and enforcement agencies to educate the boating public who use cell phones to call 911 for help while on the water through materials distribution.

- Customer satisfaction survey of Washington's 9-1-1 county coordinators to determine customer service levels. The information guides future actions of the State E911 Office in its product and service delivery.

- Training forums statewide for county E911 personnel to assist in their performance as a 911 professional.

- Conducted an annual, two-week PSAP call taker survey to gather 911 call statistics for future public education efforts.

- Educational publications targeting specific audiences: PBX/School Risk Managers; Cell Phone User Misdials to 911 (English and Hispanic versions); Voice over Internet Protocol (VoIP) Users explaining limitations in placing 911 calls over the Internet.

- Public education materials for counties for use at public gatherings, such as county fairs, with a focus on assuring that there is an understanding of how to use the statewide 911 dialing capability effectively.

Financial/Budget

- A total of $4.8 million was distributed to 33 counties during fiscal year 2006. The funding reimbursed eligible operational costs incurred by the counties which exceeded their local E911 tax revenues.

- Per the 2006 budget proviso, created and administered the first contract for the operational costs for the Washington Information Network (WIN) 211 Program. WIN 211 provides Washington state residents with a single, easy-to-use phone number (211) by which they can obtain information on health and human services.

- Automated the county grant application process to enable electronic submission, speeding up contract reimbursements to the counties.

- Supported county requests for technical, financial, and public education assistance in accordance with state law and administrative code.

- Implemented a staggered funding mechanism to upgrade 911 equipment at Washington State Patrol Public Safety Answering Points (PSAPs), with funding being provided for one PSAP in FY2006.

- Provided an annual report out to the Washington Utilities and Transportation Commission (WUTC) in support of continuance of the 911 tax at a fixed rate of 20 cents per month per subscriber for wireline services.

Challenges

Network Diversity

Although the dual tandem project moved the network into a diverse configuration, there are many links where diversity is not assured due to single cable paths or dominant carrier facilities. Those links are being identified by Qwest and, where possible, diverse facilities are being placed into service. Where Qwest cannot provide diversity, the state will be working with Qwest to implement diverse connectivity. That effort will require innovation and cooperation with others, possibly including private communications suppliers.

PSAP Hardware Upgrades

The hardware at Public Safety Answering Points is computer-based, often with multiple Personal Computers at each work station and multiple controllers. This equipment supports the software-based communications tools including 911 telephone systems, computer-aided dispatch systems and computer-controlled radio consoles. Both the hardware and software in these systems have limited life spans and are plagued by the computer industry trends where frequent capability upgrades create obsolescence factors that require frequent major upgrades.[1] In the PSAP environment, there is considerable interaction between positions and systems which must be equally supported by all hardware. About 30 PSAPs are supported by the State E911 Program with telephone system costs averaging around $250,000 per system. However in the past two years, few systems have been replaced creating a backlog.

Database Upgrades

The E911 databases are being managed today using techniques that were common 30 years ago. These databases are restricted in accepting and displaying data. While the databases are reliable, they cannot be manipulated to accommodate emerging needs. These systems require major changes to current practice technology resulting with assurance of system reliability and no downtime. The frame relay project upgrades the network capacity to handle new data techniques, with a pragmatic upgrade of data handling techniques to follow.

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[1] Operating system upgrades are introduced about every four years, and support for the older software is discontinued about one year before the next major release. Hardware vendors begin building to the new software specifications before formal introduction of the next upgrade generally terminating the capability to support older protocols. The result is that PSAP equipment, where equal capabilities to access all operating elements are a requirement, has a maximum life cycle of about seven to eight years.

Voice over Internet Protocol (VoIP)
This is a relatively new technology to deliver telephone service. To a substantial degree it has already been integrated into the E911 systems in Washington State, although full integration cannot be accomplished until substantial upgrades are made to the technology used for managing the 911 calls. One issue with VoIP is that it is not included in the taxing authority as is the case for traditional wireline or wireless telephone services. Major sales efforts are currently underway in the promotion of VoIP services. We believe this technology will be widely utilized in the near future.

If a taxing structure is not modified to accommodate the change to VoIP technology, the E911 Program viability could be threatened as VoIP technologies replace traditional services. The specific issue is that the reference for application of the excise tax is "switched access line". VoIP services route packets and do not utilize switches as in traditional voice telecommunications.

Regionalization
The E911 Program was established to assist counties in providing statewide E911 service and included regional operations as a suggested solution. Concern continues to be raised that small PSAPs serving smaller population counties is not an efficient use of 911 tax dollars. Additionally, there is a need for more network support for the larger PSAPs. The current state policy supports regional PSAP implementation based on self-nomination. Policy review is focused forward with possible adoption of rules that will give counties improved stability in considering a regional effort. Two regional Public Safety Answering Points (PSAPs) now successfully each serve multiple counties. In the urban counties, multi-jurisdictional PSAPs operate successfully as independent agencies offering service under contract.

Next Generation 911 (NG911)
Next Generation 911 is a set of standards being developed to permit the migration of the 911 network to an Internet Protocol (IP) -based platform. NG911 is equivalent to today's switched based operations in reliability. NG911 is flexible in accommodating not only new technologies but new ways to manage the data associated with providing effective emergency services.

The new systems must accommodate inputs from telematics providers as well as text messaging necessary for effective services to the deaf community. NG911 must be capable of processing pictures as well as feeding information to other systems, such as field medical devices and automated dispatch services. This network upgrade is comparable to the change in the retail industry as they moved from store sales and manual inventory to internet sales of products distributed directly from suppliers. Moving to this technology will entail an unprecedented effort for the E911 Program.

Call Accounting and Reporting System (CARSNet)

The State E911 Program contracted for the installation of a Call Accounting and Reporting System (CARSNet) to be installed in all PSAPs in the state. CARSNet is an Internet-based information system designed specifically for the management and administration of 911 Call Centers. In addition to automating the reporting of 911 call activity, CARSNet provides for automation of a number of other activity reports that will reduce county workload while providing improved information. The system is also real-time reporting for call volumes and can provide early detection for network problems. The movement to this system for statistical collection will coincide with the development of the State E911 Program annual operations' contract with the county. The annual operations' contract will need to have provisions for accommodating the new data collection capabilities.

Pandemic Contingency Planning

The one public safety service that must operate at a near normal or an even higher level of operation in a pandemic health-related event is 911. Planning is underway for PSAP preparedness which will be a local decision for implementtation. Pandemic planning for network contingencies that will permit load sharing between PSAPs statewide began this past September.

Financial Condition and Statistics

Call Volumes

In calendar year 2005, over 6.1 million 9-1-1 calls answered at 64 Public Safety Answering Points (PSAPs) were accounted for by those counties with state operations' contracts. Of those calls, 2.6 million were made from wireless phones.

FY 2006 Allocation and Expenditure

Statewide Services Provided

The following are statewide services provided to the counties by the Enhanced 911 Program by direct acquisition in support of their 911 systems.

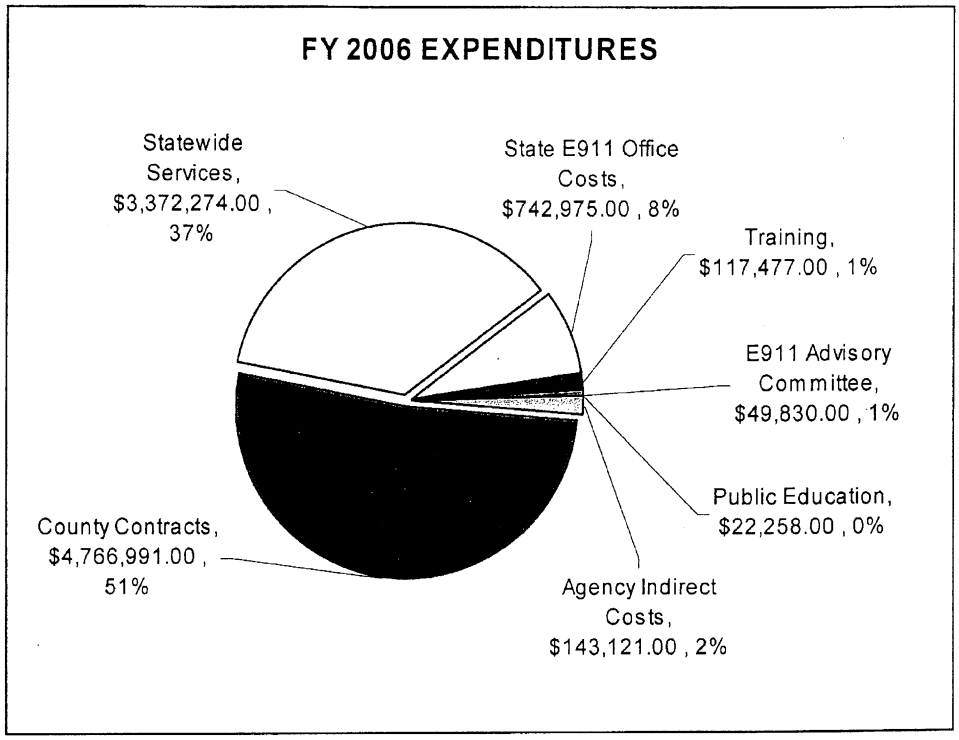
- Selective Routing
- Local Exchange Carrier (LEC) Interface costs for Qwest counties
- Tandem Router Upgrades
- Frame Relay
- Production, warehousing and dissemination of 911 Public Education brochures and promotional items statewide
- Facilitation of three, annual E911 County Coordinator Forums (funding up to three PSAP personnel from each county per forum)
- Contract with the Washington Criminal Justice Training Commission to conduct statewide telecommunicator training for PSAP personnel and for county in-house trainers of telecommunicators
- Contract with the Seattle-based Hearing, Speech and Deafness Center to provide statewide Teletypewriter (TTY) training for telecommunicators
- TeleAtlas (mapping software)
- Language Line

County Services Provided

The following items are supported by the State for all counties to the degree that local E911 Excise Tax funds do not cover county costs.

- Switching Office Enabling
- Automatic Number Identification (ANI)
- ANI/Automatic Location Identification (ALI) Controllers And Maintenance
- Phase II Computer-Aided Dispatch (CAD) system upgrade
- Telephone System and Maintenance
- ANI/ALI Display equipment
- PSAP Mapping Maintenance
- ALI/Data-base Management Service (DMS)
- County Enhanced 911 Coordinator duties
- Master Street Address Guide (MSAG) / Mapping Administration
- E911 Mapping Administration Hardware/Software
- Telecommunication Device (TDD)/TTY and Maintenance
- Traffic Studies between the Switching Office and the Selective Router
- Traffic Studies between the Switching Office and the Selective Router
- Traffic Studies between the Selective Router and the PSAP
- 911 Call Receiver salaries and benefits
- Uninterruptible Power Supply (UPS) and Maintenance
- Night Service
- Route diversity between Selective Router and PSAP
- Call Receiver Training
- Language Line Charges
- Instant Call Check Equipment and Maintenance.
- Mapping Display
- 911 Management Information Systems (MIS)
- Call Detail Recorder and/or Printer and Maintenance
- Headsets for 911 Call Takers
- Costs associated with destruction of E911 Records
- 911 Coordinator Electronic Mail (e-mail)
- Logging Recorder and Maintenance
- CAD and Maintenance
- Auxiliary Generator and Maintenance
- Clock Synchronizer and Maintenance

Expenditures and Revenues
The FY2006 Expenditures shown below demonstrate the commitment to county assistance either through direct reimbursement or by acquisition of services that directly support E911 availability.



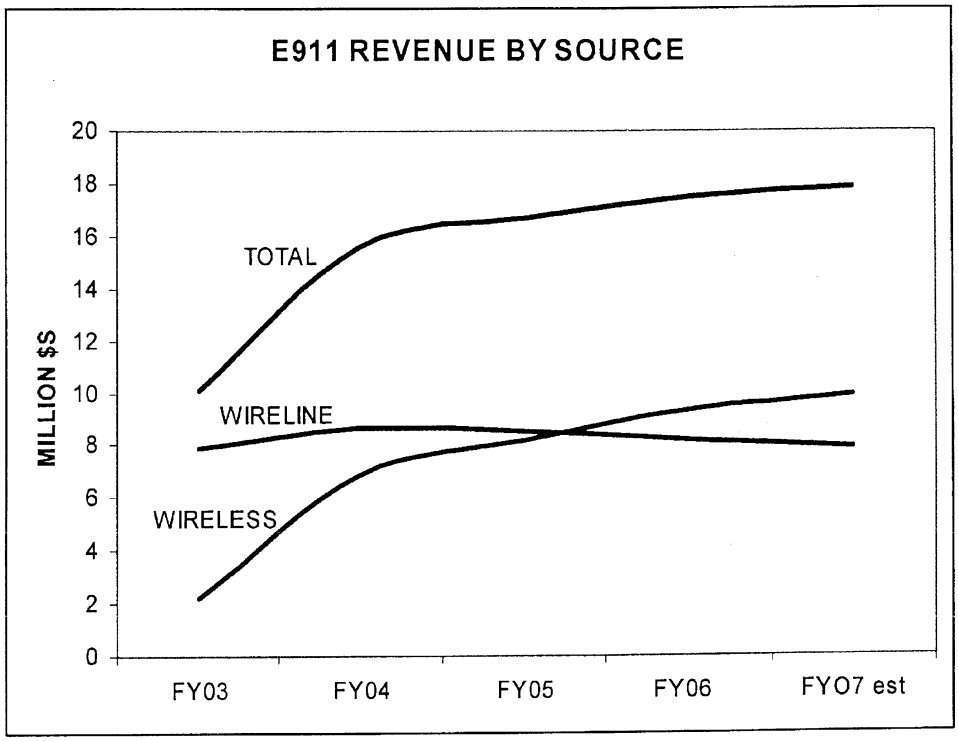
HISTORY OF ANNUAL 911 EXCISE TAX COLLECTED

Historically the E911 excise tax revenues have continued to grow but would have declined had not the Legislature extended the tax to wireless in 2003.

FY 1999	$ 3.4 mil
FY 2000	$ 9.6 mil
FY 2001	$11.7 mil
FY 2002	$ 6.3 mil
FY 2003	$10.2 mil
FY 2004	$15.6 mil
FY 2005	$16.7 mil
FY 2006	$17.5 mil

WIRELINE vs WIRELESS REVENUES

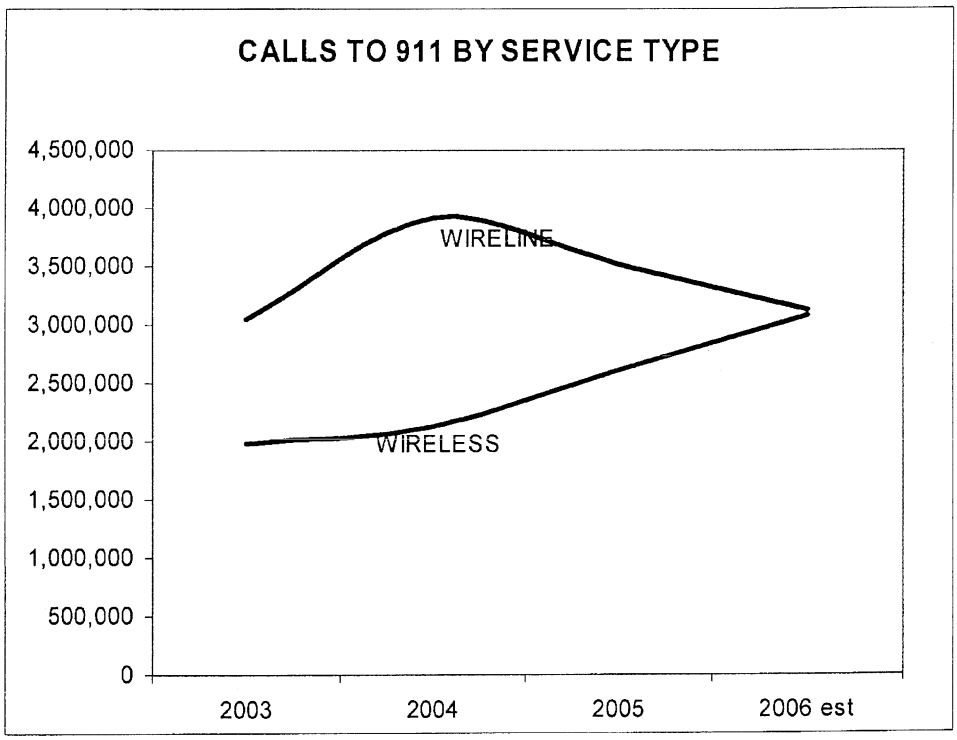
	Wireline Revenues Collected	Wireless Revenues Collected
FY03	$7.9 mil	$2.2 mil
FY04	$8.7 mil	$6.9 mil
FY05	$8.5 mil	$8.2 mil
FY06	$8.2 mil	$9.3 mil



REPORTED 911 CALL VOLUMES

Calls to 911 continue to increase somewhat proportionally to the number of telephone units in service. Call volumes for those counties with state operations' contracts are reported monthly to the State E911 Office. Call volumes for non-contractual counties are submitted on a voluntary basis to the State E911 Office.

	911 Wireline Calls	911 Wireless Calls	VoIP Calls
CY 2003	3,049,563	1,978,172	
CY 2004	3,923,837	2,123,241	
CY 2005	3,522,655	2,605,295	
CY 2006 6 mo. not all counties	1,131,533	1,130,802	3,172 (King Co)



Challenges to the E911 Program – Estimated Costs

Estimates have been made of the cost of addressing the challenges to the E911 Program. In some cases these costs will displace existing costs; but, even in those instances because of the need to assure ongoing operational capability for a period of time, it will be necessary to operate dual system elements.

ESTIMATE OF NEW PROJECT COSTS	Fiscal Year				Four-year Total
	2006-07	2007-08	2008-09	2009-10	
Network Diversity	$480,800	$28,280	$28,280	$28,280	$565,640
Database Upgrades	$1,300,000	$650,000	$550,000	$300,000	$2,800,000
Voice over Internet Protocol (VoIP)	$138,000	$15,000	$15,000	$0	$168,000
Regionalization	$500,000	$500,000	$500,000	$500,000	$2,000,000
Next Generation 911 (NG911)	$713,150	$4,310,900	$4,525,750	$2,269,940	$11,819,740
Call Accounting & Reporting System	$360,000	$70,000	$70,000	$70,000	$570,000
Pandemic Contingency Planning	$1,849,525	$24,865	$24,865	$24,865	$1,924,120
Equipment Replacement	$1,193,000	$2,133,500	$2,375,000	$2,630,500	$8,332,000
Total	$6,534,475	$7,732,545	$8,088,895	$5,823,585	$28,179,500

E911 Advisory Committee

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